FIG. 1

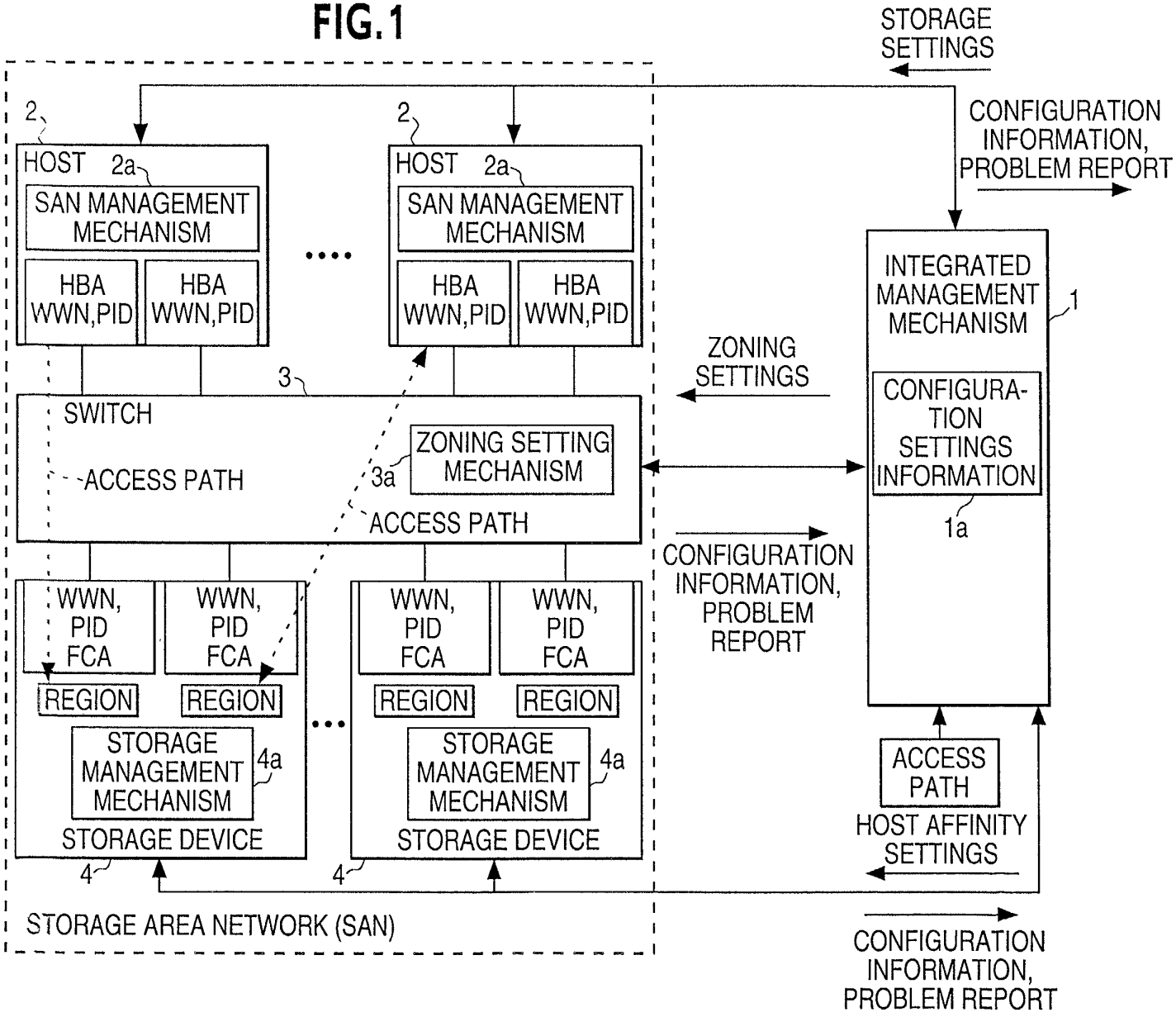

STORAGE SETTINGS
CONFIGURATION INFORMATION, PROBLEM REPORT
2
HOST
2a
SAN MANAGEMENT MECHANISM
HBA WWN,PID
HBA WWN,PID
INTEGRATED MANAGEMENT MECHANISM
1
ZONING SETTINGS
3
SWITCH
ACCESS PATH
ZONING SETTING MECHANISM
3a
CONFIGURATION-TION SETTINGS INFORMATION
1a
CONFIGURATION INFORMATION, PROBLEM REPORT
WWN, PID FCA
REGION
STORAGE MANAGEMENT MECHANISM
4a
STORAGE DEVICE
4
ACCESS PATH
HOST AFFINITY SETTINGS
STORAGE AREA NETWORK (SAN)
CONFIGURATION INFORMATION, PROBLEM REPORT

FIG. 2

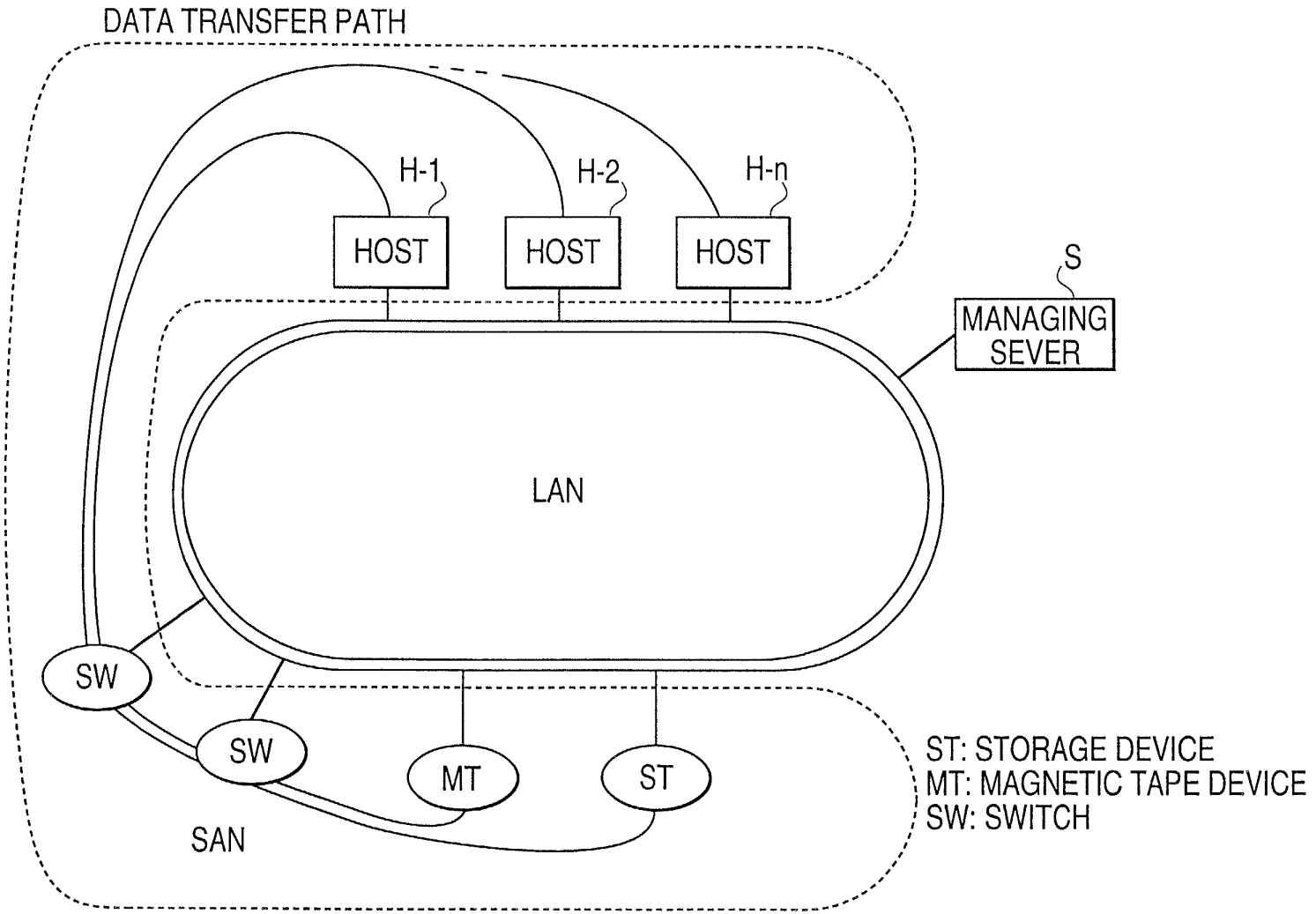

DATA TRANSFER PATH
H-1
H-2
H-n
HOST
HOST
HOST
S
MANAGING SEVER
LAN
SW
SW
MT
ST
SAN
ST: STORAGE DEVICE
MT: MAGNETIC TAPE DEVICE
SW: SWITCH

FIG. 3

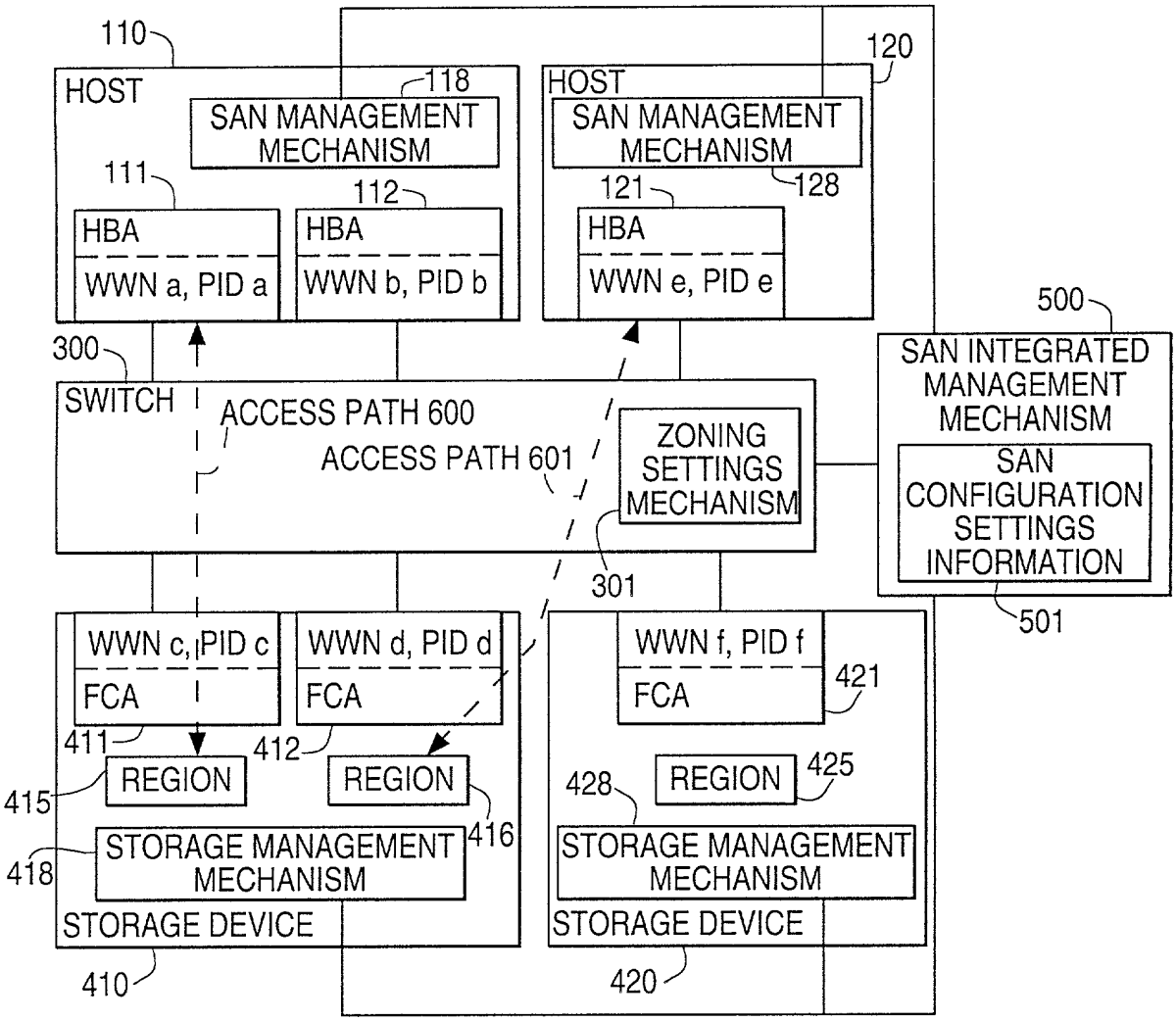

110
HOST
118
SAN MANAGEMENT MECHANISM
111
112
HBA
WWN a, PID a
HBA
WWN b, PID b
120
HOST
SAN MANAGEMENT MECHANISM
128
121
HBA
WWN e, PID e
500
SAN INTEGRATED MANAGEMENT MECHANISM
SAN CONFIGURATION SETTINGS INFORMATION
501
300
SWITCH
ACCESS PATH 600
ACCESS PATH 601
ZONING SETTINGS MECHANISM
301
WWN c, PID c
FCA
411
WWN d, PID d
FCA
412
WWN f, PID f
FCA
421
REGION
415
REGION
416
REGION
425
428
STORAGE MANAGEMENT MECHANISM
418
STORAGE MANAGEMENT MECHANISM
STORAGE DEVICE
410
STORAGE DEVICE
420

FIG. 4

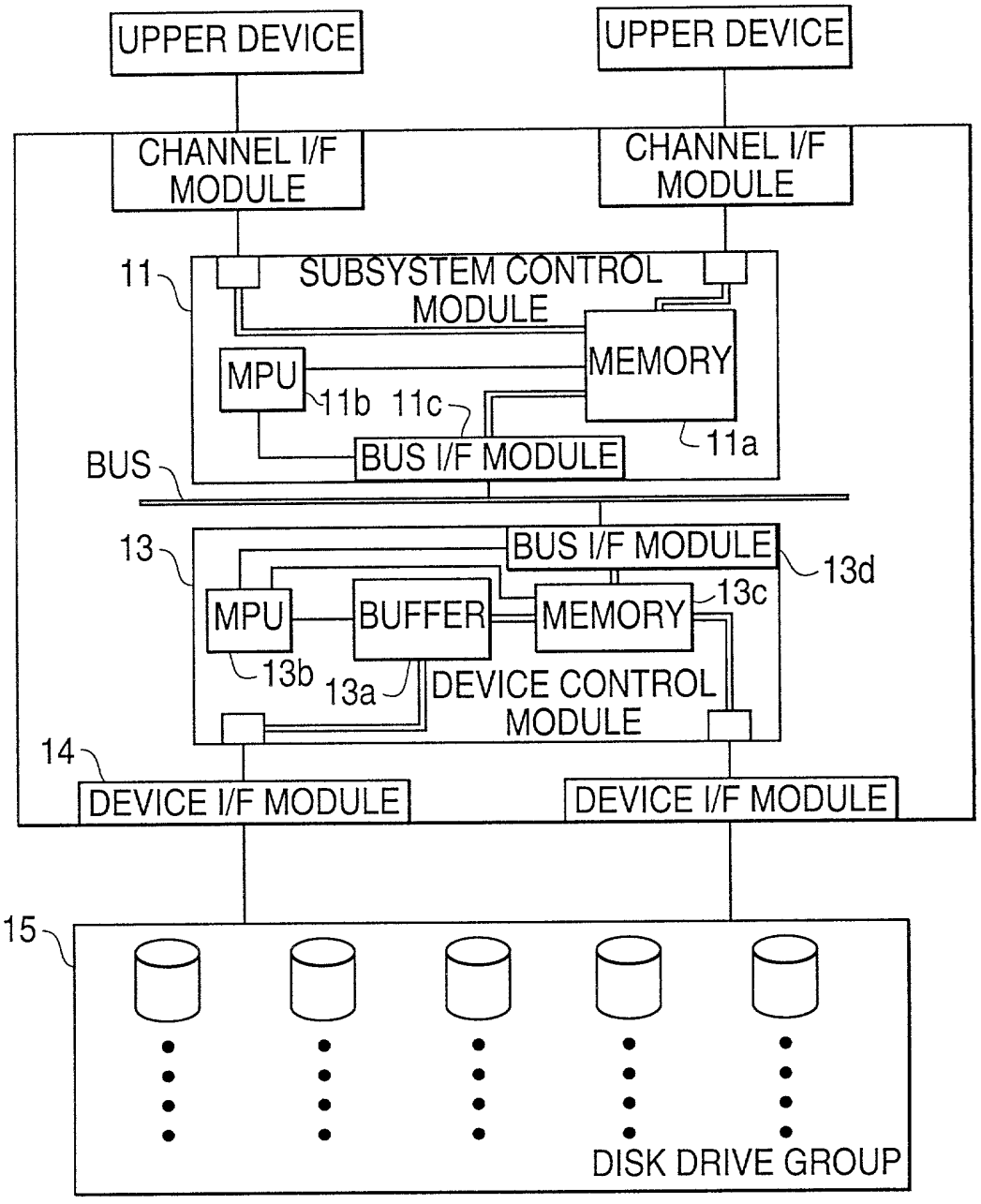

UPPER DEVICE
UPPER DEVICE
CHANNEL I/F MODULE
CHANNEL I/F MODULE
11
SUBSYSTEM CONTROL MODULE
MPU
MEMORY
11b
11c
11a
BUS I/F MODULE
BUS
13
BUS I/F MODULE
13d
MPU
BUFFER
MEMORY
13c
13b
13a
DEVICE CONTROL MODULE
14
DEVICE I/F MODULE
DEVICE I/F MODULE
15
DISK DRIVE GROUP

FIG. 5(a)

ACCESS PATH SETTINGS INFORMATION IN
THE SAN INTEGRATED MANAGEMENT MECHANISM

ACCESS PATH	HOST	HBA(WWN,PID)	STORAGE DEVICE	FCA (WWN,PID)	REGION
600	110	111 (WWNa, PIDa)	410	411 (WWNc, PIDc)	415
601	120	121 (WWNa, PIDa)	410	412 (WWNd, PIDd)	416

FIG. 5(b)

STORAGE AFFINITY TABLE (FOR HOST 110)

HBA	ACCESS DESTINATION FCA INFORMATION	FCA SUBORDINATE ACCESS REGIONS
111	WWNc	415
112	NONE	NONE

FIG. 5(c)

SWITCH ZONING TABLE (FOR SWITCH 300)

ZONE NAME	ZONING SETTINGS
A	WWN a, WWN c
B	WWN e, WWN d

FIG. 5(d)

HOST AFFINITY TABLE (FOR STORAGE 410)

FCA	ACCESSIBLE HBA INFORMATION	CORRESPONDING REGION
411	WWN a	415
412	WWN e	416

FIG. 6

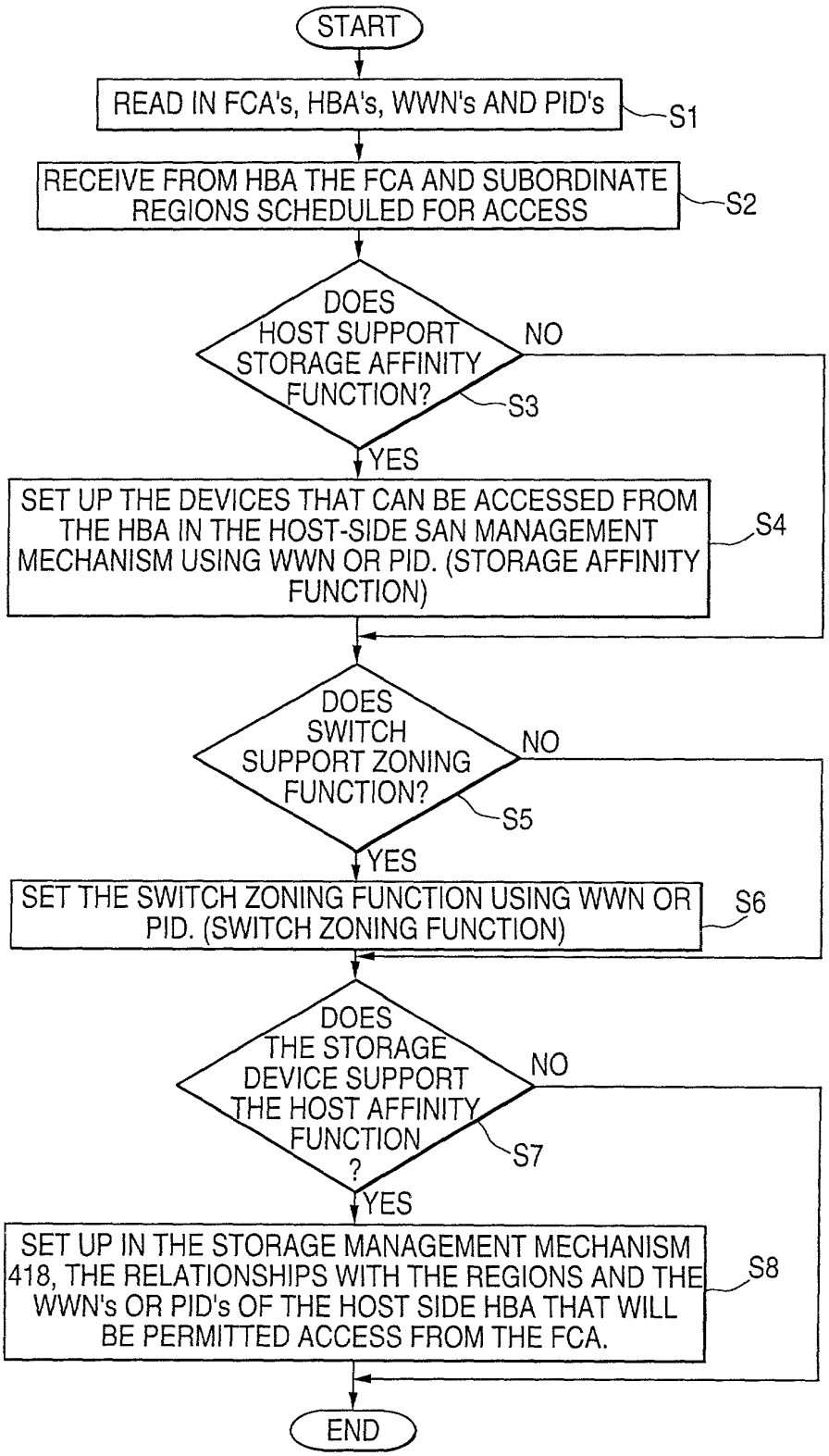

START
READ IN FCA's, HBA's, WWN's AND PID's
S1
RECEIVE FROM HBA THE FCA AND SUBORDINATE REGIONS SCHEDULED FOR ACCESS
S2
DOES HOST SUPPORT STORAGE AFFINITY FUNCTION?
S3
NO
YES
SET UP THE DEVICES THAT CAN BE ACCESSED FROM THE HBA IN THE HOST-SIDE SAN MANAGEMENT MECHANISM USING WWN OR PID. (STORAGE AFFINITY FUNCTION)
S4
DOES SWITCH SUPPORT ZONING FUNCTION?
S5
NO
YES
SET THE SWITCH ZONING FUNCTION USING WWN OR PID. (SWITCH ZONING FUNCTION)
S6
DOES THE STORAGE DEVICE SUPPORT THE HOST AFFINITY FUNCTION ?
S7
NO
YES
SET UP IN THE STORAGE MANAGEMENT MECHANISM 418, THE RELATIONSHIPS WITH THE REGIONS AND THE WWN's OR PID's OF THE HOST SIDE HBA THAT WILL BE PERMITTED ACCESS FROM THE FCA.
S8
END

FIG. 7

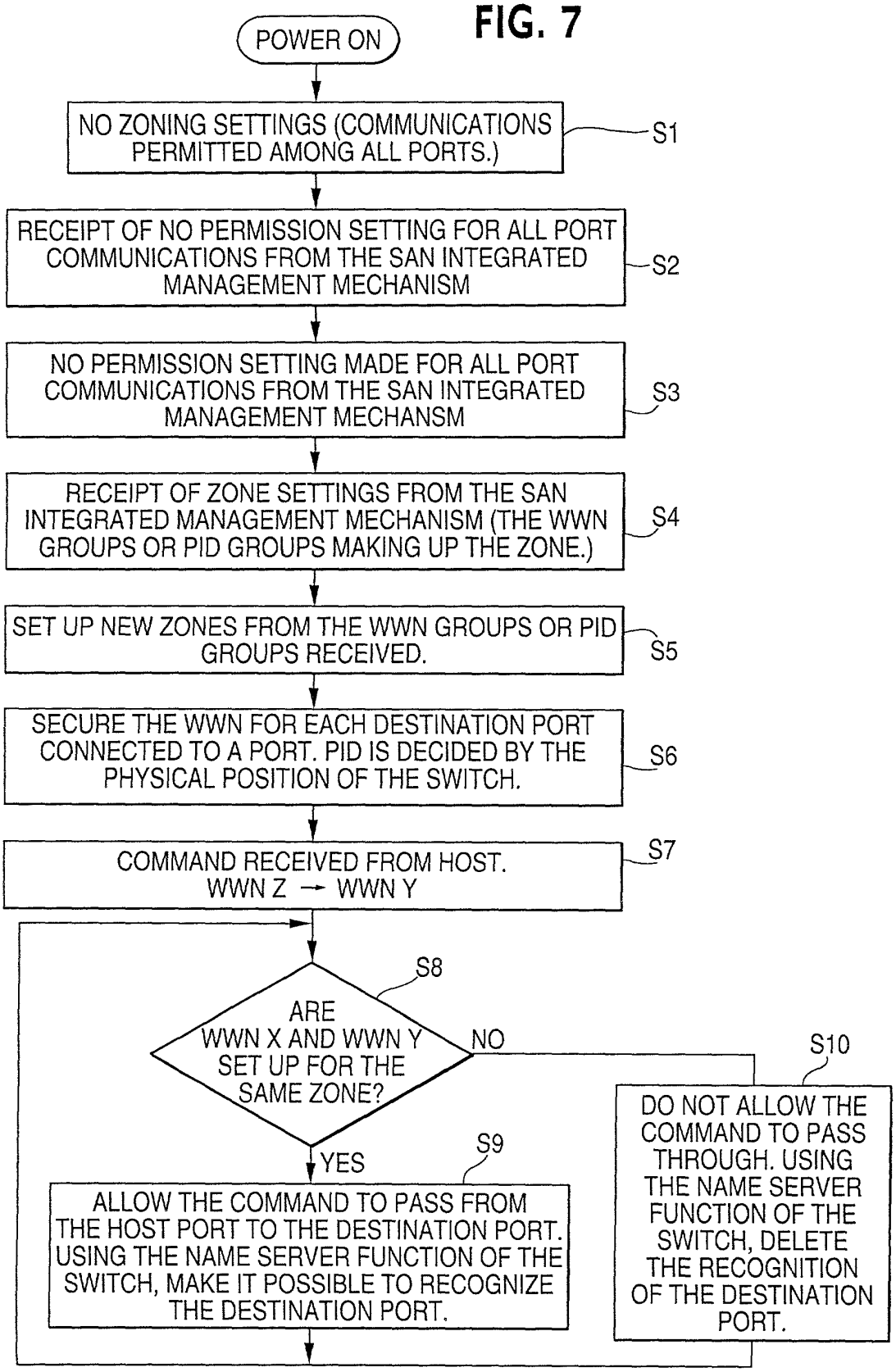

POWER ON
NO ZONING SETTINGS (COMMUNICATIONS PERMITTED AMONG ALL PORTS.)
S1
RECEIPT OF NO PERMISSION SETTING FOR ALL PORT COMMUNICATIONS FROM THE SAN INTEGRATED MANAGEMENT MECHANISM
S2
NO PERMISSION SETTING MADE FOR ALL PORT COMMUNICATIONS FROM THE SAN INTEGRATED MANAGEMENT MECHANSM
S3
RECEIPT OF ZONE SETTINGS FROM THE SAN INTEGRATED MANAGEMENT MECHANISM (THE WWN GROUPS OR PID GROUPS MAKING UP THE ZONE.)
S4
SET UP NEW ZONES FROM THE WWN GROUPS OR PID GROUPS RECEIVED.
S5
SECURE THE WWN FOR EACH DESTINATION PORT CONNECTED TO A PORT. PID IS DECIDED BY THE PHYSICAL POSITION OF THE SWITCH.
S6
COMMAND RECEIVED FROM HOST.
WWN Z → WWN Y
S7
S8
ARE WWN X AND WWN Y SET UP FOR THE SAME ZONE?
NO
S10
DO NOT ALLOW THE COMMAND TO PASS THROUGH. USING THE NAME SERVER FUNCTION OF THE SWITCH, DELETE THE RECOGNITION OF THE DESTINATION PORT.
YES
S9
ALLOW THE COMMAND TO PASS FROM THE HOST PORT TO THE DESTINATION PORT. USING THE NAME SERVER FUNCTION OF THE SWITCH, MAKE IT POSSIBLE TO RECOGNIZE THE DESTINATION PORT.

FIG. 8

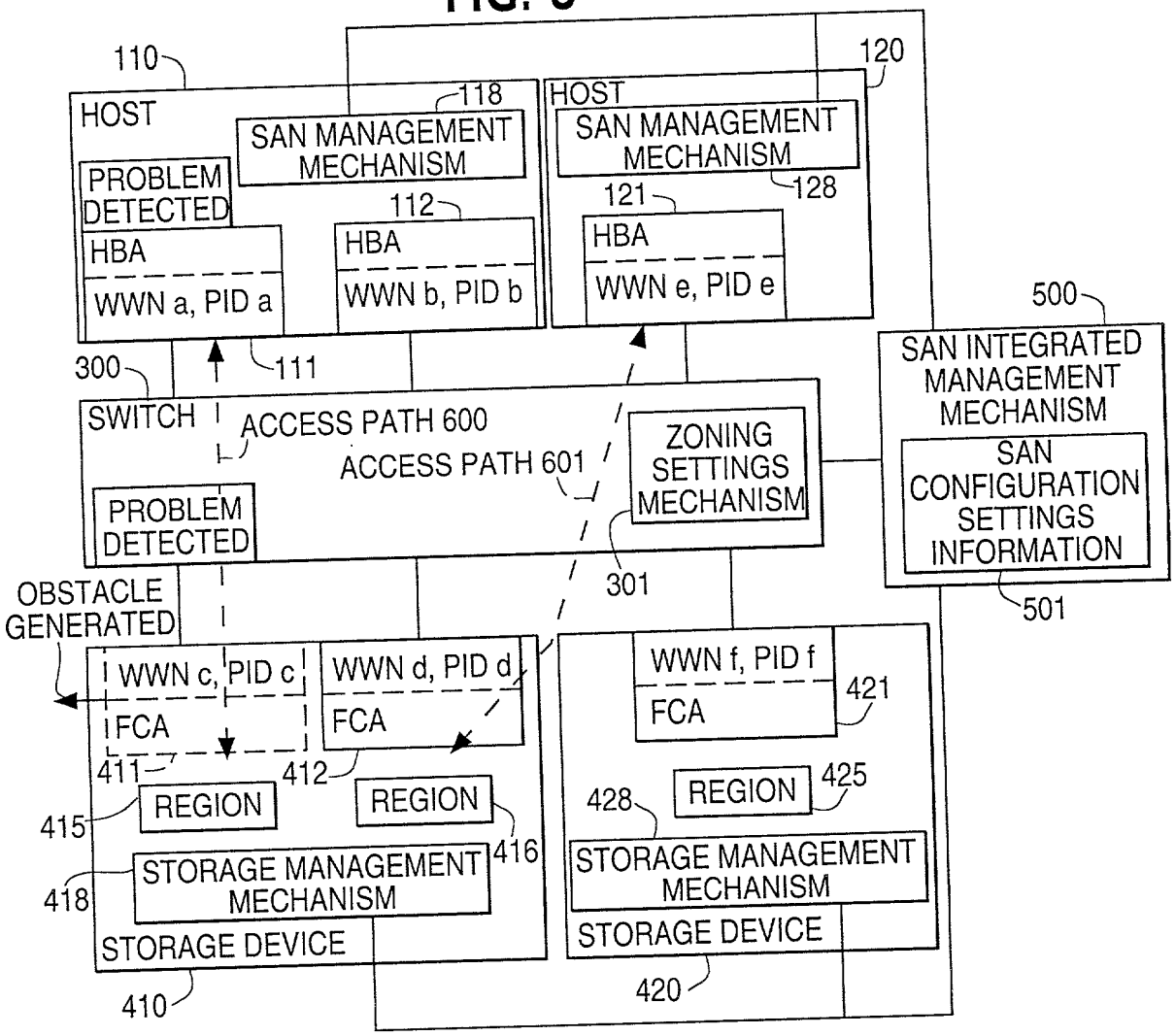
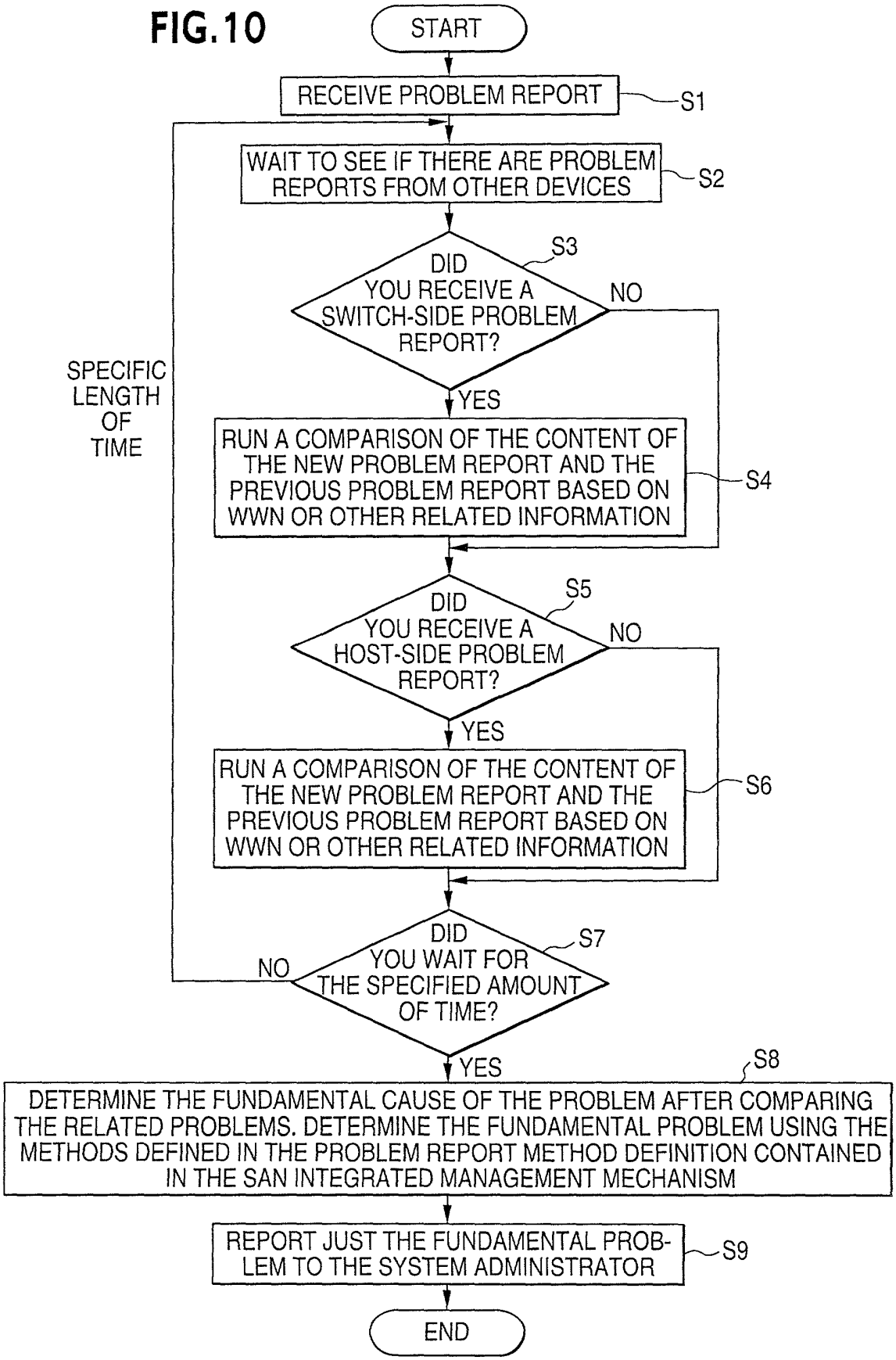


FIG. 9

PROBLEM INFORMATION RECEIVED	PROBLEM REPORT CONTENT
FCA ERROR + SWITCH PORT ERROR + HOST-SIDE ACCESS ERROR, SWITCH PORT ERROR + HOST-SIDE ACCESS ERROR	FCA ERROR SWITCH PORT ERROR

FIG.10


START
RECEIVE PROBLEM REPORT
S1
WAIT TO SEE IF THERE ARE PROBLEM REPORTS FROM OTHER DEVICES
S2
DID YOU RECEIVE A SWITCH-SIDE PROBLEM REPORT?
S3
NO
YES
SPECIFIC LENGTH OF TIME
RUN A COMPARISON OF THE CONTENT OF THE NEW PROBLEM REPORT AND THE PREVIOUS PROBLEM REPORT BASED ON WWN OR OTHER RELATED INFORMATION
S4
DID YOU RECEIVE A HOST-SIDE PROBLEM REPORT?
S5
NO
YES
RUN A COMPARISON OF THE CONTENT OF THE NEW PROBLEM REPORT AND THE PREVIOUS PROBLEM REPORT BASED ON WWN OR OTHER RELATED INFORMATION
S6
DID YOU WAIT FOR THE SPECIFIED AMOUNT OF TIME?
S7
NO
YES
DETERMINE THE FUNDAMENTAL CAUSE OF THE PROBLEM AFTER COMPARING THE RELATED PROBLEMS. DETERMINE THE FUNDAMENTAL PROBLEM USING THE METHODS DEFINED IN THE PROBLEM REPORT METHOD DEFINITION CONTAINED IN THE SAN INTEGRATED MANAGEMENT MECHANISM
S8
REPORT JUST THE FUNDAMENTAL PROBLEM TO THE SYSTEM ADMINISTRATOR
S9
END